PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
WBH/AAF		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB 03/05706	31.12.2003	09.01.2003
International Patent Classification (IPC) or both national classification and IPC		
G05D16/18		
Applicant		
AAF-MCQUAY INC. ET AL.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
22.06.2004	11.03.2005
Name and mailing address of the international preliminary examining authority:	Authorized Officer
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/05706

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-7 as originally filed

Claims, Numbers

1-9 received on 21.02.2005 with letter of 18.02.2005

Drawings, Sheets

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-9
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-9
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-9
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V.

1 Reference is made to the following document:

D1: WO-A-9815788.

2 The subject-matter of claim 1 is considered as new (Article 33(2) PCT) and involving an inventive step (Article 33(3) PCT) for the following reasons:

2.1 Document D1, which is considered to represent the most relevant state of the art, discloses (see page 8, line 1 to page 10, line 21 and figure 1) a valve comprising a housing having an inlet (18) and an outlet (19), and a pressure sensing port (24), a piston (23) slidable in a part of the housing in response to a difference between a first fluid pressure in a first chamber (25) connected to the pressure sensing port (24) on the one side of the piston (23), and a second fluid pressure in an internal chamber (26) connected to the outlet on the other side of the piston (23), a valve member (22) carried by the piston (23) and operable thereby to close the inlet (18) when the second fluid pressure is less than a value sufficiently greater than the first fluid pressure; wherein the valve member (22) is movable with respect to the piston under action of a second spring (36). The valve is intended to avoid accidental backflow of condensed refrigerant (see page 3, lines 24 to 32). Thus, it is considered that this action is provided by the fact that the valve member (22) is movable with respect to the piston which facilitates closing of the inlet, in response to a fluid flow from the housing to the inlet, when the piston is not acting to close the inlet.

2.2 From this, the subject-matter of independent claim 1 differs in that:

- manual shut-off means are provided for closing the valve; and
- biasing means being arranged to bias the valve member with respect to the piston to close the inlet.

2.3 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT).

2.4 The distinguishing features may be regarded as solving a safety problem.

2.5 The solution to this problem proposed in claim 1 is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
In the valve as disclosed in document D1, a lifting spring (36) applies a force to the

valve member to lift the valve member off the seat. This would refrain the skilled person to provide biasing means arranged to bias the valve member with respect to the piston to close the inlet.
Thus, the subject-matter of claim 1 involves an inventive step.

3 Claims 2-9 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

CLAIMS

1. A valve comprising a housing having an inlet and an outlet, and a pressure sensing port, a piston slidable in a part of the housing in response to a difference between a first fluid pressure at the pressure sensing port on the one side of the piston, and a second fluid pressure at the inlet and/or outlet on the other side of the piston, a valve member carried by the piston and operable thereby to close the inlet when said second fluid pressure is less than a value sufficiently greater than said first fluid pressure; wherein the valve member is movable with respect to the piston to facilitate closing of the inlet, in response to a fluid flow from the housing to the inlet, biasing means being arranged to bias the valve member with respect to the piston to close the inlet, when the piston is not acting to close the inlet, and wherein manual shut-off means are provided for closing the valve.

2. A valve according to claim 1, wherein piston biasing means are arranged to bias the piston into a position in which the valve member closes the inlet.

3. A valve according to claim 2, wherein the piston biasing means comprise one or more helical springs.

4. A valve according to claim 1, 2 or 3, wherein the valve member is formed with an inlet surface arranged to come into contact with a valve seat of the inlet and an opposed surface facing into the housing.

5. A valve according to claim 4, wherein the area of the opposed surface of the valve member is substantially equal to the area of a surface of the piston facing said opposed surface.

6. A valve according to any preceding claim, wherein the valve member has a stem slidably guided within a part of the piston.

7. A valve according to any preceding claim, wherein the valve member biasing means comprises a helical spring.

8. A valve according to any preceding claim, wherein the manual shut-off means comprise a spindle having a non-round proximal portion and a threaded distal portion.

9. A valve according to claim 8, wherein said distal portion is engaged in a non-rotatable threaded sleeve, the sleeve being slidable along the distal portion between a normal position in which the piston is movable and a maintenance position in which the sleeve retains the piston and the valve member in the closed position.